the friction between air and water is as great as he supposes, it ought to produce a sensible effect, and since winds blow as often and as long down-stream as up-stream, the water-surface should as often be accelerated as retarded, and the vertical velocity parabola should as often have its axis above the water-surface as below it. Boileau does indeed suggest that the absorption of air by the water and the evaporation of the water cause a loss of energy near the surface, but here again the cause seems as inadequate as air-friction. The experiment of Francis, quoted on p. 107, is admitted by Major Cunningham, to prove that "there is a continual transfer of water from the bed towards the surface, even in water in apparently tranquil motion," and his own float-observations (p. 269) show that "near the edge of a stream there is a persistent flow of the water at and near the surface from the edge towards the centre." Now the flow from the bottom and sides towards the top and centre brings water, stilled by impinging on roughnesses of the bed, to replace the quick moving surface-water. It is not true that the water so rising must acquire the velocity of the layers through which it passes, for it may rise in eddying masses, which are but little affected by the friction on their surface, or the motion of the water may be in horizontal spiral paths, which allow the bottom water to reach the surface without passing through the quicker moving central parts of the stream. At all events the transfer of the bottom water to the surface is a known phenomenon, and it is adequate as an explanation of the diminution of surface velocity.

In Chapter XVI. is given a somewhat elaborate theory of the motion of a rod-float, which leads to the result that the rod-velocity is slightly less than the true mean velocity of the water past the immersed portion of the rod. Quite apart from the question of the general unsteadiness of the motion of the water, it may be pointed out that the relative velocity $v-u$ of the streams impinging on the rod must for the most part fall below the limit for which the pressure due to impact or friction can be assumed to vary as the square of the velocity. Hence the calculation that the rod-length should be 0·94 of the depth of the water to give a true mean velocity, seems an extremely doubtful one.

In criticising thus two or three points of theory, it must be pointed out that these matters do in fact lie somewhat outside the main objects of the experiments, and an error on these points detracts nothing from the practical value of Major Cunningham's work. W. C. U.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

"Weather Forecasts"

Will you permit me to call attention to the apparently complete failure of the Forecasts of Weather given in the daily papers with respect to the storm of Tuesday, October 24? The matter seems to me to be one of much practical moment. Here is an extract from the "Weather" article in the *Times*, which I presume agrees with that given in each of the daily papers:—

Forecasts of Weather for Tuesday, October 24 (issued at 8.30 p.m. on the previous day).

0. Scotland, N.—South-westerly breezes, fresh or moderate; showery.
1. Scotland, E.—South-westerly breezes, moderate; some showers, with bright intervals.
2. England, N.E.—Same as No. 1.
3. England, E.—Same as No. 5.
4. Midland Counties.—Same as No. 1.
5. England, S. (London and Channel).—Westerly and south-westerly breezes, light to fresh; fine and cold at first, some local showers later.
6. Scotland, W.—Same as No. 0.
7. England, N.W. (and N. Wales).—Same as No. 0.
8. England, S.W. (and S. Wales).—South-westerly winds, fresh to strong; showery.
9. Ireland, N.—Wind returning to south-west, and freshening; weather showery.
10. Ireland, S.—Same as No. 9.

Warnings.—None issued.

By order,
Robert H. Scott, Secretary.

Notice particularly the concluding words: "Warnings; none issued;" and then remember what took place. It is curious to compare in this respect the *Times* of October 24 with that of October 25. In the latter issue we read as follows:—

"Yesterday morning a violent gale of wind, accompanied by a heavy downpour of rain, visited London. The previous night was beautiful, but at three o'clock yesterday morning the sky became overcast, and from half-past four o'clock up to ten o'clock there was an incessant downpour of rain. At half-past nine o'clock the upper part of 19, Windmill Street, King Street, New Cut, was stripped off, and the occupiers of the upper floors had a narrow escape. At ten o'clock a sign-board was carried away from the frontage of a house in Jewry Street, Aldersgate Street. Although the street was crowded, no one was reported hurt. At Five Fields, Dulwich, the grass was strewn with broken arms from the trees, and a large elm at Norwood was blown down. A portion of a large shed situated near the Surrey Gardens Estate was unroofed. The trees in the various metropolitan parks have suffered severely from the gale. The River Thames at ten o'clock resembled a small sea, and much damage was done to the shipping below London Bridge."

And much more to the same purpose.

I feel desirous of knowing, both on general and scientific grounds, and also for obvious practical reasons, whether any explanation can be given of this absolute breakdown of weather science. It would seem to be possible that a storm can visit our coasts, and do immense destruction both by sea and land, and yet not give the faintest notice to our weather prophets of the impending danger; and it really almost makes one smile to perceive that on the day of the storm no warnings were issued, and that on the day after "the South Cone was hoisted this morning in Nos. 2, 3, 5, 7, and 8."

If no mistake has been made in the observations, and a mistake seems scarcely possible, we seem to be driven to the conclusion that a storm of the first magnitude can come upon us unawares; and if this be so, the conclusion is discouraging and very strange as regards science, and it is very serious as affecting the value of forecasts of the weather to fishermen and others.

I write this letter with the hope that some light may be thrown upon the subject to which it refers. H. Carlisle

Rose Castle, Carlisle, October 26

The Comet

I beg that you will allow me space for a few lines of comment upon the letters and drawings of the comet in your last issue, my own included. While thanking the engraver for the generally accurate reproduction of my sketch, it is clear that wood-engraving scarcely admits of a perfect rendering of stumped shading. A few words of correction will serve all the purpose of preserving for possible future use the evidence which I wished to put on record. The chief defect is in the *isolation* given to the "wisp," described by another correspondent as a "horn." It seemed rather to be an inclined elongation of the brightest part. The inclination too is exaggerated: its prolongation should have passed *within* the star on the northern[1] border, but

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[1] The tail lies nearly along a parallel of declination.

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clear of the head. The only other alteration I should desire would be the strengthening of the brightness all along the middle or axis of the tail, and the smoothing away of all other features such as now seem indicated in the body of it. Trivial as these changes may seem, the ultimate value of the drawing, if it should ever have any, must depend on its accuracy. The feebleness of the feature which attracted my attention may at the same time be inferred from its absence in the adjoining contemporaneous sketch accompanying Mr. Seabroke's letter, while its reality is proved by the descriptions in the two letters which follow. As regards the "rift" or "shadow," on which stress is laid by Mr. Williams at Cannes, one cannot help suspecting that this impression was the effect of contrast *only*—contrast between the complete absence of tail in that quarter, and the unrecognised presence of exceedingly feeble luminosity due to the extension and diffusion of cometic matter roundabout. It would require very strong evidence indeed to establish the real presence of *shadow* in the ordinary sense of that term.

One other point deserves notice. You have three contemporaneous accounts, from Rugby, Hawkhurst (Kent), and Cheltenham, all referring to the morning of October 23. Considering how rude and unsettled the weather has been for weeks past, so extensive a clearance was rather remarkable.

The brightness of this comet's tail may be inferred from an observation which I made during the current week, and which will perhaps excite as much surprise, if not incredulity, in others as it did in me. Sunday night was clear and bright, with a moon four days past the full. I was at an hotel in London, and on the stroke of three I stole into a vacant room in the third floor, the window of which looked south-east. Here I stood for a full hour looking for the comet, scarcely able to credit my senses, as the morning drew on without my seeing it. With the naked eye I could see stars of the 5th, and with a binocular, stars in Hydra of the 7th or even 8th magnitude; but no comet. At first I was uncertain, for this very reason, as to the identity of α Hydræ, although if I had not been seeing the comet flaring below it so frequently during the last three or four weeks, no such doubt would have occurred to me. At last, as all the small stars of Hydra gradually settled themselves in my recollection in their right places, and I knew *exactly* where the whole length of the comet *must* be, and the whole being then well above the opposite roof, I fancied at times that I could make out a faint illumination in the proper place; but not even then, with the binocular, could I find the head; nor could I, without previous knowledge, have been able to testify confidently to the presence of the tail.

I regret that I cannot condense this account without sacrificing some of the conditions which help to make so strange a disappearance credible. If anyone had told me on the 23rd that the object I was then drawing would be invisible to me a week later, in London, *by reason of moonlight only*—for the visibility of small stars proves the clearness of the atmosphere—how could I have credited it? I feel, therefore, that I cannot expect to be believed unless the whole circumstances are told, even though they betray my uncertainty about stellar configurations when deprived of the aid of a map. J. HERSCHEL

ON Wednesday, the 25th instant, at 6.10 a.m., Mr. Hodges and I again obtained two measures of position of the nucleus with the equatorial, after correcting for instrumental errors and refraction, the mean of the readings comes out R.A. 10h. 6m. 48s., Dec. 17° 2′ 55″. But owing to flexure of the instrument and to the fact that the circles read only to 20″ and 2s. respectively, these figures are open to correction. Daylight, with a little haze, had so far advanced when the measures were completed, that only the nucleus was distinguishable in the telescope; but with the filar micrometer I measured its length; the mean of two readings came out to 41″·5, but owing to the gradual shading off of the nucleus, one's readings might vary 5″ according to its assumed limits. The width I made about 10″. I was rather surprised at these results, as I had estimated its length two days before at about 10″ only; but I had then used an eye-piece to which I am not accustomed, and my estimate was probably an error. The position angle of the major axis of the nucleus was 108° 7′.

Though the comet was fainter by reason of the bright moon, still we could trace the tail as far as on Monday, the 23rd.

We viewed the comet at 5 a.m., but owing to buildings in the line of sight, we got no reliable readings until 6 a.m.

In my sketch of the nucleus in your last issue, the engraver has made it round, with a fainter elongation. It appeared of nearly the same brightness throughout. GEO. M. SEABROKE

Temple Observatory, Rugby, October 30

I SEND herewith two sketches of the comet made by me on the mornings of October 23 and 31, and a few brief particulars which may be of some value.

October 23, 1882, at 4.30 a.m., the first sketch was made. At 4 o'clock the atmosphere was exceptionally clear, and the sky continued cloudless until 5 o'clock, when a few light clouds appeared. The comet was not brilliant, although clearly seen. Nucleus with coma presented an indistinctly outlined disc a few degrees above the horizon, and obliquely upwards was a tail which stretched more than 15° across the sky. I compared the extent of tail at the time with the distance between α and β Orionis, and the tail had decidedly the best of it. Whilst glancing from the comet to Orion, I saw in the intervening sky-space, in little over three minutes, no less than *five* meteors, one of which left a long luminous trail visible several seconds. The extremity of the tail was broad. Its *under* boundary was a well-defined line about 40° from the horizontal, and was slightly convex downwards. The *upper* boundary was about 45° from the horizontal, was nearly straight, but very ill-defined, the light fading away into darkness very gradually upwards. The fanning out of the tail was very rapid towards the far end. The termination was somewhat fish-tail shaped, since there was centrally a deepish concavity between the extreme limits, which projected horn-like. The light of the tail was broken into two unequal areas by an obscure streak. The inclosed lower area was the smaller and decidedly brighter, and on its lower side contained a still brighter area, that, starting from the upper part of the coma, gradually passed into the lower boundary.

October 31, 1882, at 5.30 a.m., the second sketch was made. The atmosphere was again very clear, but the moon's light dimmed the comet greatly, and exactly at 6 o'clock it and the coming dawn rendered it indistinguishable. The naked eye could distinguish none of the features observed on the 23rd, but the general outline had somewhat changed, and the comet had changed its position relatively to the stars. ARTHUR WATTS

Manor House, Shincliffe, Durham, October 31

MAY I beg the readers of NATURE, who possess good measures of the course of the great comet, kindly to publish them in NATURE? I would also be very much obliged for good measures of the distances of different envelopes of the head from the nucleus. The measures are desirable in two directions—*towards* the sun, and *perpendicularly* to this direction. Of the greatest scientific interest would be a complete series of measures during the whole period of visibility of the comet, and especially in the first and last days of this period. B.

"The Burman"

MR. E. B. TYLOR, in his review of "The Burman" in NATURE (vol. xxvi. p. 593), has fallen into an error which it may be well to correct. He says that the tattooing on the body of the "Greek nobleman," Georgios Konstantinos, "was evidently done by Burmese tattooers, and is a masterpiece of their unpleasant craft." This is a mistake into which even a man who had seen many specimens of Burmese tattooing, might fall. But it could never be made by a Burman. The general resemblance to the decorations on the Burman's thighs is close enough, but each separate figure, when done by the Burmese Sayah, is surrounded by a border of Burmese letters, in many cases as a mere ornament, but in not a few with a special cabalistic meaning. Still, however blurred with age, they can always be recognised as Burmese characters. I went down and examined the "tattooed nobleman," which he was good-natured enough to allow me to do very closely, and the result was to convince me that it was no native of Burma who so cruelly victimised the poor man. The frames of the figures might have been letters, but if so, they were of some language with which I am unacquainted. Moreover, many of the figures themselves were such as a Burman Sayah never uses; such as especially the birds and serpentine creatures, while the elephants were of a very inferior character. The Beeloos (ogres) and Kyah-Beeloos (tiger-ogres), moreover, which appear on every Burman's legs, were absent, and, most conclusive of all, there was not a single inn, not one cabalistic square. No Say-Sayah I ever knew would have had self-control enough to have omitted these signs of his wisdom in magic. Mr. Tylor says the story of Konstantinos is "mostly

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